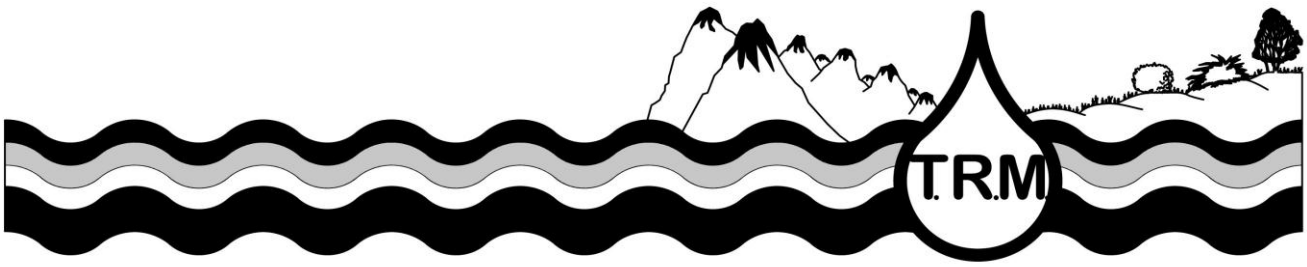
The River Mile

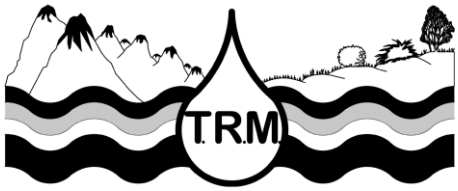
Stewardship Lessons

Contents



2009-2010

What is environmental stewardship?



Subject: Stewardship

ELAR-GLE: **Component 3.2 Science, Technology, and Society**: Analyze how science and technology are human endeavors, interrelated to each other, society, the workplace, and the environment.

3.2.4 Understand how humans depend on the natural environment and can cause changes in the environment that affect humans' ability to survive.

Duration: 30–40 minutes

Location: School Site/classroom

When: Pre-visit One

Grade: 3rd-12th

Objectives: Students will be able to define steward and stewardship

Overview:

Students will:

A. Write reflectively about prior experience and knowledge of the natural environment
B. Analyze the definition of stewardship
C. Discuss the National Park Service Mission
D. Compare and contrast their experiences to the experiences of others
E. Assessment: Create an analogy, simile or metaphor that synthesizes the role of humans with environmental stewardship

Materials: Stewardship Power Point (SPP) slides 1-8, science journal

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Procedure:

Slide #1: Ask students to brainstorm ideas about the question. "What is environmental stewardship"? Make a class list of their thoughts

Slide#2: Ask students to reflect and then write about the following questions

1. Think of a time when you were out in nature and you had a powerful experience of the beauty or were in amazed by the natural environment
2. In your science journal, write about what you saw, heard, smelled, and touched.

3. Do you remember what you were feeling and thinking, if so, write that down also?
4. Why do you think the memory of this experience has stayed with you?

Slide #3: Ask students to write the definitions of steward and stewardship in their science journals. As a class, discuss the meanings and analyze how this definition can be applied to the "environment".

Steward: a person who manages another's property or financial affairs; one who administers anything as the agent of another or others (e.g., managing servants, purchasing food and wine, in a hotel, restaurant, ship, or airplane)

Stewardship:

1. the office, duties, and obligations of a steward
2. the conducting, supervising, or managing of something; especially the careful and responsible management of something entrusted to one's care

Slides #4 -7: Select students to read aloud the "NPS Mission and Visitors Guidelines", check for student understanding of the purpose of the guidelines for the protection of the park environment. The River Mile Project will be conducted on NPS lands.

The National Park Service Mission **Protecting Your National Parks**

The National Park Service was established on August 25, 1916 to:

- *"...promote and regulate the use of the Federal areas known as national parks, monuments, and reservations... by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."*

The National Park Service: Visitor Guidelines

Be a good park visitor by obeying park regulations, including, but not limited to:

- Take nothing but photographs and memories, leave nothing behind
- Enjoy yourself and remember future visitors who will come after you hoping to enjoy these American treasures too.
- Support stewardship of the park by becoming educated about the park's natural and cultural resources.
- pick up trash (including pet waste)

- keep dogs leashed
- leave precious resources undisturbed, including artifacts
- properly dispose of fishing lines and carcasses, and
- Do not use metal detectors.

Slide #8: Culminating Assessment Activity for Lesson #1

Guide students through sharing the experiences they wrote about at the beginning of lesson #1. Each pair of students will write a simile, analogy or metaphor. Homework could be given to illustrate the analogy, simile or metaphor. These can then be posted around the classroom, or scanned into an electronic file to share on-line.

How do your experiences in nature relate to "Environmental Stewardship"?

1. Work with a partner and decide who will be A and who is B.
2. Partner B you have 2 minutes to share the story about your experience with nature. Partner A listens and does not speak.
3. When time is called, Partner A you have two minutes to tell about your experience. Partner B listens and does not speak.
4. When Partner A's time is over, discuss both of your stories and how they could relate to the idea of stewardship.
5. Together create a simile, analogy, or metaphor for environmental stewardship. (e.g., an environmental steward watches over the watershed like a hen watches over her chicks)

Definitions and Examples:

Simile: a figure of speech comparing two unlike things that is often introduced by *like, as*, or than (as in *cheeks like roses*) (e.g., **an environmental steward is like an earth angel)**

Analogy: 1.inference that if two or more things agree with one another in some respects they will probably agree in others. 2 a: resemblance in some particulars between things otherwise unlike : **SIMILARITY b:** comparison based on such resemblance **(e.g. environmental stewards count plants and animals in their environment over time the way accountants count and track money in bank accounts each month).**

Metaphor: a figure of speech in which a word or phrase literally denoting one kind of object or idea is used in place of another to suggest a likeness or analogy between them (as in *drowning in money*); **(e.g., An environmental steward is a tireless watchdog)**

Columbia River Watershed Stewardship

Subject: Stewardship

ELAR-GLE: **Component 3.2 Science, Technology, and Society**: Analyze how science and technology are human endeavors, interrelated to each other, society, the workplace, and the environment.

3.2.4 Analyze how human societies' use of natural resources affects the quality of life and the health of ecosystems.

Duration: 30-40 minutes.

Location: School Site

When: Pre-visit One

Grade: 3rd-12th

Objectives: Students will be able to 1) identify what types of environmental stewardship are need in the Columbia River Watershed; 2) locate the Columbia River Watershed on a map; 3) identify ways humans use the Columbia River watershed.

Overview

Students will:

A. View the location and sizes of the Columbia & Lake Roosevelt Watersheds
B. Write from prior knowledge, view images, discuss benefits and issues, and begin to understand the River Mile Essential Question:
"How do we simultaneously use and protect our watershed"?

Materials: Stewardship Power Point slides 9-28, science journal, Background documents: FWEE: Columbia River Basin & LRF: Lake Roosevelt Fast Facts

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Procedure:

Slide #9: Purpose: To access student's prior knowledge and conduct a quick informal assessment of the background student's bring to the lesson.

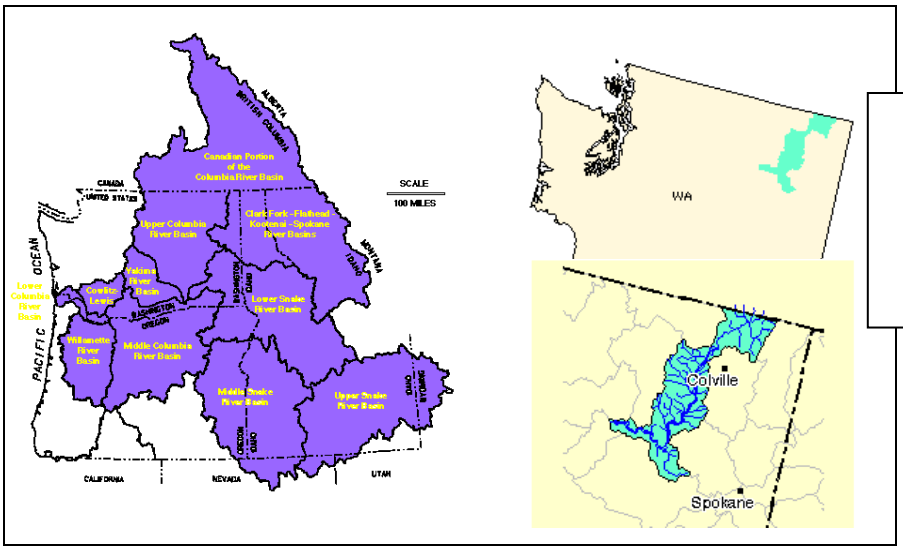
1. Ask students to quickwrite (3-5 minutes) in their science journals and respond to the question, **"What environmental stewardship is needed in the Columbia River Watershed"?**

2. Have students create categories and chart. (Option: Give students ten post-it notes. On each post-it record one way in which stewardship is needed. Chart the aspects mentioned along the "X" axis and create a bar graph using student

post-its across the "Y" axis to show the number of students who recorded the same issue.

Water pollution	
Forest fires	
Trash & litter	
Animal waste	
Spawning Grounds	
Loss of wet lands	

Slides #10 & 11 Introduce students to the size and location of the Columbia Watershed which includes the Lake Roosevelt Watershed



The watershed covers nearly 260,000 square miles, an area the size of France

Wow what a huge area!

Slide #12: Guide students to write, share, compare, discuss and report the ways that people use the watershed. Chart the responses

EQ: How do relationships among components of an ecosystem in a watershed affect water quality?

1. In your science journal, make a list of all the ways people use rivers, lakes, and the natural environment (i.e., watershed)
2. Share and compare your list with a partner's list.
3. Discuss additional ways people use the natural resources
4. Add any new ideas to your list and prepare to report out.

Slides #13-17: Students view images of use for recreation, commerce, homes and communities, and human needs and compare their responses, adding any new ideas that they did not include prior to viewing the slides

Slide #18: ***As above,*** Guide students to write, share, compare, discuss and report the ways that people need to protect the watershed. Chart the responses

Slides #19-28: Students view images of the protection needed for our watersheds (e.g., animal waste, trash, invasive species, storm water runoff, fertilizers & pesticides, toxic chemicals, clear cut logging, forest fires, development of wetlands, spawning grounds for fish) and compare their responses, adding any new ideas that they did not include prior to viewing the slides

A Code of Conduct

Subject: Stewardship, codes of conduct, professionalism

ELAR-GLE: **Component 3.2 Science, Technology, and Society**: Analyze how science and technology are human endeavors, interrelated to each other, society, the workplace, and the environment.

3.2.4 Analyze how human societies' use of natural resources affects the quality of life and the health of ecosystems.

Duration: 20-30 minutes

Location: Classroom

When: Pre Site Visit One

Grade: 3rd-12th

Objectives: Students will be able to 1) identify appropriate behavior as environmental stewards; and 2) comply with National Park Service rules.

Overview:

Students will: Reflect, discuss, analyze and synthesize information to co-develop an agreed upon code of conduct for participation in the River Mile Research Project and demonstrate understanding for why these agreements are valuable for valid science and the on-going health of the watershed.

Materials: Stewardship Power Point Slides # 29-34, Science Journal

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Procedure:

Slide #29: Ask students to consider question 1 below by reflecting on the NPS Visitor Guidelines, our discussions of stewardship, the River Mile Essential Question, and the rules of behavior we use in the classroom.

Slide # 30: In the science journal, ask students to (2 below) make a list of the most important things to remember to guide our actions.

EQ: How do relationships among components of an ecosystem in a watershed affect water quality?

1. What code of conduct will we follow so that we are environmental stewards while we are researching and collecting data in the watershed?
2. Make a list of the most important things to remember that will guide our actions
3. Compare your list with the park's Rules and Reminders.

Slides #31-34 Ask students to read, discuss and compare the park's rules and reminders to the lists of behaviors they wrote.

The River Mile Rules and Reminders

- WALK, leave no trace of your passing
- Stay with your group or working unit
- Follow directions of chaperones, teachers, and park rangers
- Keep voices to a normal talking level, loud noise will diminish animal sightings
- Do not gather plant or animal specimens, or parts thereof, without a research permit
- DO not disturb rocks or other archaeological materials. Moving things out of place destroys the story it tells. Take a photo or make a sketch of its location and tell the park ranger.
- Remove any litter
- No gum chewing, eating, or smoking during the site visit,
- Eat only at designated times and places
- Leave all radios, tape players, CD players, and games on the bus
- Use data collection instruments carefully
- Keep track of supplies, moving them with you as you go
- Remember to use all of your senses. Take time researching and collecting data so you identify and understand all the variables and characteristics of your "River Mile" research site.

Assessment: Direct students to use either expository writing or a three frame cartoon strip to explain why following an agreed upon code of behavior is important for the River Mile Research Project?

Learning From Others

Subject: What can we learn about environmental stewardship from the President's Environmental Youth Awards (PEYA) Winning Projects?

ELAR-GLE: **Component 3.1 Designing Solutions: Apply knowledge and skills of science and technology to design solutions to human problems or meet challenges.**
3.1.1 Analyze common problems or challenges in which scientific design can be or has been used to design solutions

Duration: Option 1: Student Cooperative Group Presentations 40 – 70 minutes
Option 2: Teacher Presentation 15 minutes

Location: School Classroom

When: Post site Visit One

Grade: 3rd-12th

Overview:

Option One Students will:

a) Work effectively in cooperative teams
b) Read, analyze, and synthesize information from one of 10 regional projects conducted by the President's Environmental Youth Award Winners
c) Demonstrate understanding by planning and presenting the PEYA information to classmates applying the assessment criteria provided.

Materials: Stewardship Power Point Slides 35-46
Handout PEYA Winners Regions 1-10
Chart paper, materials and supplies for visual or dramatic presentation
Freeze Frame Tableau handout

Slide # 36 Background: President's Environmental Youth Awards

http://www.epa.gov/enviroed/peya/index.html

- Since 1971, EPA has sponsored the President's Environmental Youth Awards (PEYA). The program recognizes young people across America for projects which demonstrate their commitment to the environment. Young people in all 50 states and the U.S. territories are invited to participate in the program.
- Projects submitted in the past have covered a wide range of subject areas including recycling programs in schools and communities; construction of nature preserves; major tree planting programs; videos, skits, and newsletters created by students that focused on environmental issues; and environmental science projects.

Procedure: Option One

1. Divide students into 10 cooperative groups.
2. Discuss the Presentation Assessment Criteria Rubric
3. Assign each group one of the 10 regional PEYA Winners below and provide the background information handout
    - **Slide # 37: Region 1: Get the Lead Out of Fishing**
      Michael Browne, Eagle Scout, BSA Troop 5, Milton, MA
    - **Slide # 38: Region 2:Bedsidebooks**
      Raphael Spiro Forest Hills, NY
    - **Slide # 39: Region 3: "We'll Bring It to You" Curbside Electronics Recycling**
      HB Woodlawn 6th Grade Science Class Arlington, Virginia
    - **Slide # 40: Region 4: Energy Star**
      Wiser Misers Energy Team 3rd grade, Huntingdon, Tennessee
    - **Slide # 41: Region 5: International Fair**
      Kate 3rd grade, Arlington Heights, Illinois
    - **Slide # 42: Region 6: Public Environmental Awareness Program**
      Bianca 12th grade, Pasadena, Texas
    - **Slide # 43: Region 7: Stream Team #432 Water Quality Monitoring**
      Reeds Spring High School, Reeds Spring, Missouri
    - **Slide # 44: Region 8: EARTH Action Montana**
      Ten 6, 7, & 8th graders, Helena, Montana
    - **Slide # 45: Region 9: Indoor Air Pollution: The Pulmonary Effects of Ozone-Generating Air Purifiers** Otana Jakpor, Riverside, CA
    - **Slide # 46: Region 10: Cool School Campaign**
      Redmond High School, Redmond, Washington
4. Establish the timeline for reading (5 min)., planning (15 min) and presentation (3 min per group = 30-40 min depending on transition time)
5. Student Presentations (student and/or teacher assessment w/rubric

Procedure: Option Two:

1. Teacher shows slides # 37-46, briefly describing each project
2. Asks students to analyze which aspects of the PEYA projects could apply to the River Mile Project. .
3. Discuss the common problems or challenges between their River Mile Site and the Regional projects and how a scientific research design can be used to design local solutions
4. Chart ideas generated and save for Lesson 5.

River Mile Stewards

Subject: What is my role as a steward of our River Mile?
What do we want to accomplish together this year?

ELAR-GLE: **Component 2.1 Investigating Systems:** Develop the knowledge and skills necessary to do scientific inquiry

2.1.1 Understand how to ask a question about objects, organisms, and events in the environment

2.1.1 Understand how to ask, generate, and evaluate a question that can be answered through scientific investigation

Component 3.1 Designing Solutions: Apply knowledge and skills of science and technology to design solutions to human problems or meet challenges.

3.1.2 Understand how the scientific design process is used to develop and implement solutions to human problems

3.1.2 Apply and evaluate the scientific design process to develop and implement solutions to problems or challenges

Duration: 20 – 40 minutes introduction and on-going throughout River Mile Project

Location: Classroom and River Mile Site

When: Post Site Visit One and preparation for Site Visit Two

Grade: 3rd-12th

Overview:

Students will:

1. Reflect on all of the River Mile experiences to date
2. Create a personal mission statement for participation in the River Mile Project
3. Collaborate in small groups and as a class to plan a scientific research design which can be implemented to solve problems or challenges found in their River Mile Site
4. Design a scientific process to provide the National Park Service with needed data about their site
5. Collect data to share with other schools engaged in the River Mile Project at the end of year Student Science Summit.

Materials: **Stewardship Power Point Slides 47-50**
GLE 3.1 Handout (3-5, 6-8, and 9-12): Designing Solutions
Science journal

Procedure:

Slide #47: The Teacher introduces students to the concept of a personal mission and to designing a scientific research project that will provide data to the NPS and possibly solve problems or challenges found during their visit to the River Mile Site

Slide #48: Students reflect individually and respond in writing to the questions. Students may choose to share their ideas or not.

> What is your personal mission for participating in The River Mile Project?
>
> 1. What do you hope to accomplish?
> 2. What do you think will be challenging
> 3. What could be exciting?
> 4. What actions are you already thinking about?

Slide #49: In small working groups, students discuss the question and develop one recommendation for research on use and one recommendation for research on the protection of their River Mile Site.

Each group will have an opportunity to refine their ideas and share them with the class. It is not necessary to come to a consensus yet, rather let students consider all recommendations for a few days

> What do we want to accomplish this year?
>
> Now that we have been to our River Mile site and assessed its conditions, what ideas de we have and what do we want to do to promote the simultaneous use and protection of this section of our watershed?

Slide #50: Discuss ELAR-GLE 3.1 for designing scientific solutions to problems

3.1.2 Understand how the scientific design process is used to develop and implement solutions to human problems (3-5)

- (3, 4, 5) Propose, implement, and document the scientific design process used to solve a problem or challenge:
  - ☐ define the problem
  - ☐ scientifically gather information and collect measurable data
  - ☐ explore ideas
  - ☐ make a plan
  - ☐ list steps to do the plan
  - ☐ scientifically test solutions
  - ☐ document the scientific design process
- (3, 4, 5) Describe possible solutions to a problem (e.g., preventing an injury on the playground by creating a softer landing at the bottom of a slide).
- (3, 4, 5) Describe the reason(s) for the effectiveness of a solution to a problem or challenge.

3.1.2 Apply the scientific design process to develop and implement solutions to problems or challenges. (6-8)

- (6, 7, 8) Propose, implement, and document the scientific design process used to solve a problem or challenge:
  - ☐ define the problem
  - ☐ scientifically gather information and collect measurable data
  - ☐ explore ideas
  - ☐ make a plan
  - ☐ list steps to do the plan
  - ☐ scientifically test solutions
  - ☐ document the scientific design process
- (6, 7, 8) Explain possible solutions to the problem (e.g., use pulleys instead of levers to lift a heavy object).
- (6, 7, 8) Explain the reason(s) for the effectiveness of a solution to a problem or challenge.

3.1.2 Evaluate the scientific design process used to develop and implement solutions to problems or challenges (9-10)

- (9, 10) Research, propose, implement, and document the scientific design process used to solve a problem or challenge:
  - ☐ define the problem
  - ☐ scientifically gather information and collect empirical data
  - ☐ explore ideas
  - ☐ make a plan
  - ☐ list steps to do the plan
  - ☐ scientifically test solutions
  - ☐ document the scientific design process
- (9, 10) Evaluate possible solutions to the problem (e.g., describe how to clean up a polluted stream).
- (9, 10) Evaluate the reason(s) for the effectiveness of a solution to a problem or challenge

When consensus is reached on the problem to solve, the teacher will guide students through the process of designing a research project.

Getting Involved

Subject: How can I get more involved? Are there other groups I can join?
ELAR-GLE:
Duration: 10 minute introduction. Follow-up Based on Student Interest
Location: Classroom, Home, and Community Service
When: Optional Anytime Post Site Visit One
Grade: 6^{th}-12^{th}

Overview:
Students will experience community service or service learning through individual interest in projects promoted by various national, regional and local organizations.

Materials: Stewardship Power Point Slides #51-61

Procedure: Optional

1. Using slides 51-61, the teacher introduces students to environmental organizations which sponsor community engagement in a variety of projects.
2. Students reach projects of interest and get involved based on interest and family approval.
3. Where applicable, students could earn credit for service learning hours.